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Dear Sir:
Please file the following enclosed patent application papers:
Applicant:

Thomas P. Nelson (inventor)
5 Elwyn Park Road
Portsmouth NH 03801

e-mail, tpnelson2000@yahoo.com
International telephone: (359-02) 952 0058

Mailing address:
63 Tsar Assen 1
office 5, 2nd fl.
Sofia 1463, Bulgaria

Title: FACER BEAM BARRIER SYSTEM

1. Abstract, Description and Claims:
2. Formal drawings

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FACER BEAM BARRIER SYSTEM

RELATED DOCUMENTS

This application is a continuation in part of US patent number 6,662,520 issued December 16, 2004. As a part of application number 10/281,374 this alternative designated as species "B" was disclosed in that application submitted 9/19/2000. Species "B" is also a continuation in part of application number 08/082,570 filed June 6, 1993 in the U.S. Patent and Trademark Office, now abandoned.

FIELD OF THE INVENTION

This invention advances the joining of standard building materials for manufacturing mass produced, efficient, concrete form barriers. The barrier application herein will also serve in a wide variety of uses other than formwork

The inventor has many years experience in concrete form design as well as, managing general construction.

Formwork must be assembled quickly in a rigid or sub-rigid composition and maintained in a pre-engineered and static fabrication during concrete placement and subsequently dismantled and stockpiled for future multiple uses. While experimenting with various barriers for concrete formwork, it became apparent that the modality of this system, of applying variations of; elements, parameters, and cubic content, offers a new way to build many barriers that those schooled in the art will easily recognize.

The super-ordinate beam members guide the systematic fabrication of barriers without the use of separate nails, screws, or other fastening devices to join the main beam and sub-beam this is particularly attractive in formwork as these beams must be joined and separated repeatedly as the forms are moved from one placement to another.

When produced as scale models, the invention further offers an easy method of displaying the rapid assembly of a formwork barrier as well as the rapid disassembly of the barrier for sales and instructional purposes.

TECHNICAL FIELD

The Facer Beam Barrier System embodies the specifics of numerous classes and subclasses including;

US Class 52 732.2, 737.5 , 656.1, 348, 762, 481.1, 729.1

International classifications EO4C 3/30

DESCRIPTION OF PRIOR ART

Systems of prior art teach a framing method of layering that consists of two or more layers of installed components in order to achieve a frame and cover with layers extending well beyond the limits of the load gathering dominant beam member. None of the prior art searched, that uses removable standard building materials, displays a single plane, self-contained, load gathering barrier system in which only 3 basic components can provide a continuous straight, or radius barrier, without any added parts and pieces. In fact every example of prior art indicates that conventional form systems are double the depth of the Facer Beam Barrier System in order to achieve the same amount of beam loading capacity.

None of the prior art searched by the inventor, reviewed, or found on the market displays a method similar to the ratiocinative, interlocking Facer Beam Barrier System of US Patent 6,662,520, of which this application is a continuation in part offering an alternate method of producing the super-ordinate beam.

The inventor conducted an informal prior art search and also had an international PCT search report done. International search report application number PCT/US03/02891 is applicable in part.

The International Search Report cited four previous patents as having relevant subject matter. They include;

US patent 5,848,512 by Conn issued 15 December 1998.

US patent 4,177,968 by Chapman issued 11 December 1979

US patents 4,811,539 14 March 1989 and 5,058,354 issued 22 October 1991 by Menchetti

US patent 4,858,407 by Smolik issued 22 August 1989

And the inventor also refers to US Patent 3,452,960 granted to G.F. Bowden on 1 July 1969

Many other patented formwork systems and framing systems were searched in order to prove this barrier system patent-able.

NON-OBVIOUS IMPROVEMENTS AND APPLICATIONS

Most of the prior art applications that have structural similarity to the Facer Beam Barrier System are found in formwork applications, and a review of the following examples display the differences.

Bowden teaches a method of extending transverse sub-members in repetition with the ability to overlap and stabilize a plurality of collateral vertical wales, he does not teach a method of ease and efficiency for extending his materials collaterally in a vertical direction. Bowdens system is restricted to formwork applications and does not display the parameters desired for housing the sheathing within the main load-gathering member and does not display a method of attaching sub-members such as the material interface of the invention herein.

Bowdens system does not complete formwork application and removal with the ease, versatility, and competence of the facer beam system claimed herein. The multi-functional breech and chamber beam, the highlight of this new invention, goes well beyond Bowdens load-gathering beam.

Chapman and Bowden employ a combinatory logic that requires three different beam types in support of the plywood. Bowden and Chapman both lack the ability to remove plywood modules, or to remove subordinate beams with ease.

Menchetti fails to recognize a method of overlapping subordinate beam members and he does not reveal a method of incorporating the main member or super-ordinate beam as a facer beam. Menchetti's art does not address issues related to formwork such as self-contained; staging brackets, beam connections, lifting eyes and self contained fastening systems (his fastening system is applied to each facer panel and is not a function of the main beam member).

The patent search revealed no form systems that have subordinate beams fall entirely inside the parameters of super-ordinate beams. All form systems to date offer layers upon layers of structural members designed to support and align less structurally

competent members. The patent search revealed no barrier systems or formwork systems that employ the face of beam in concert with the facer panel to achieve a continuous flat plane that may be extend horizontally or vertically with 2 standard building components plus the super-ordinate beam of this invention.

Improvement over prior art lies in many obvious and non-obvious areas. The most significant improvement is the time saved in the integration of three main building components for a sub-rigid barrier.

Further economic advantages offer the construction contractor a super-ordinate beam designed to interlock standard structural supplies, such as nominal 2x6 lumber beams and 4x8 sheets of plywood, these supplies being those most commonly used for all sorts of construction barriers. With the super-ordinate facer beams a contractor can quickly assemble and disassemble any type of temporary or permanent barrier or enclosure he may need, from formwork, to the site office and warehouse buildings, to street barricades.

The inventor has referenced the following industry manuals, plus other support issues, in the course of designing this invention, and they include:

Formwork for Concrete by MK Hurd, Fourth Edition, prepared under direction ACI Committee 347, APA, The engineered Wood Association, Residential and Commercial Design/Construction Guide, Form No. E30Q/Revised November 1998/0400,

Publications by manufacturers of prior art include: PERI Formwork and Scaffolding, PERI GmbH, Export Division PO Box 1264, D-7912 Weissenhorn, Germany, Doka International, Deutsche Doka, Schalungstechnik GmbH, Frauenstrasse 35, D-82216 Maisach/Germany.

OBJECTIVES

Concrete may be the second most traded commodity in the world and every cubic meter of concrete placed requires a mold or form to hold it in place. The formwork industry today is, dominated by a few extremely large companies, based on rentals and returns. These large companies control the market and they shape the

market to require their rental products and most of their rental products do not integrate with the competition.

The main objective of the Facer Beam System (species "B") from patent #6,662,520 is to offer a concrete formwork system that eliminates the product catalog that is full of unnecessary parts and pieces and offer a super-ordinate, breech and chamber, facer beam that contains all the appurtenances needed to complete a concrete form installation and subsequent removal.

Every one of the appurtenances mentioned, in the description, are a separate part of the systems offered today. When all these parts are functionally self-contained a great, industry wide, savings is available and escalating labor costs are brought back to a minimum.

Secondary objectives lie in the versatility of the breech and chamber beam and its ability to compete in any barrier composition whether it be for a house, factory, trailer bed, or a toy.

BRIEF SUMMARY OF THE INVENTION

The Facer Beam Barrier System is advancement in barriers, for the purpose of reducing man-hours in barrier installations. When fixed costs reduce variable cost, and when fixed cost is not significantly increased while variable costs are dramatically decreased, an economical advantage for the average consumer results.

This invention goes steps beyond simply reducing labor, as it reduces supervision and planning, by allowing the modular components to dictate their location and function in a tangible result.

Ratiocinative combinatory logic involves producing new standards for beams, beams that are historically offered as steel shapes, which allow loads to sit on their face or on their end. This invention, through reduction in cubic content, allows; deformed steel plates, hot rolled structural steel beams, cold roll-form metal beams, aluminum beams, plywood beams and the like, to be eligible for more functions.

The Facer Beam Barrier System offers a faster way to employ standard materials in the building of formwork for concrete while reducing man-hours in the installation and removal of said formwork through the significant reduction of supernumeraries and the simplicity of the combinatory logic employed.

The following descriptions will further disclose the advances this invention offers.

A BRIEF DESCRIPTION OF THE DRAWINGS Please use FIG.1as the front page

The objectives, features and advantages of the present invention will be appreciated when read in conjunction with the accompanying drawings, in which:

FIG.1 is an isometric view of a section of an assembled concrete form.

FIG.2 is an isometric view of the super-ordinate box ⊓-beam with some appurtenances.

FIG.2A, blowup cutaway view of the shoe situation plus the barrier plumbing bolts

FIG.2B is a blowup cutaway view of the through-wall tie assembly in working position.

FIG.2C is a blowup cutaway view of the tie assembly in storage position.

FIG.3 an isometric view, two super-ordinate beams coming together, with a cutaway of the pinning device

FIG.4 is an isometric cutaway view of two super-ordinate beams joining end to end.

FIG.5 is an isometric view of a super-ordinate beam, with cutaway views of two appurtenances.

FIG.6, is a back-side view of the staging bracket assembly in storage position

FIG.6A, is an exploded isometric view of the attachment between railing arm and staging arm

FIG.6B, is an isometric view of the railing arm attachment in working position

FIG.6C, is an isometric view of the railing arm attachment in storage position

FIG.6D, is an isometric view of the staging arm cantilever assembly.

FIG.7 is an isometric cutaway view of the facer-fastening appurtenance.

FIG.7A is a top view of the facer-fastening appurtenance.

FIG.7B is a face view of the facer-fastening appurtenance.

FIG.7C is a side view of the facer-fastening appurtenance.

FIG.7D is a top view of the facer-fastening appurtenance.

FIG.8 is an isometric view, of a radius form, with super-ordinate beams in a vertical position.

FIG.9 is an isometric view of a radius form with the super-ordinate beams in a horizontal position.

FIG.10 an isometric view of a column form with overlapped corners.

FIG.11 is an end view, of subordinate beams variety of positioning.

FIG.11A an end and side view of alternate shape, openings and subordinate beams.

FIG.11B an end and side view of alternate shape, openings and subordinate beams.

FIG.11C an expanded end & side view of alternate shape, openings and subordinate beams.

FIG.12 an end view of beams being used in a house-framing situation

FIG.13 an isometric view of alternative through wall tie assembly.

Fig.13A a cutaway view with a bracketed exploded view, of tie retainer assembly

FIG.14 is an isometric view of an alternative chambering method

FIG.14A is a top view of the alternative chambering method in FIG.14.

FIG.15 is an isometric view of an additional alternative chambering method

FIG.16 is a top view of an alternative facer retention method.

FIG.17 is an isometric view of an alternative facer retention method.

FIG.17A is an expanded isometric view of the wedging in FIG.17.

FIG.18 displays production of an elongated edge type wedge

A DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The description provided herein explains the manufacture, assembly, disassembly and storage of the components of the Facer Beam Barrier System. Its versatile nature in meeting barrier requirements will be obvious to those schooled in the construction and use of barriers. As shown in the drawings like numerals represent like parts throughout the various views and the following description will be clear with reference to the drawing figures and views as numbered in the description.

FIG.1 displays erected barriers used as concrete formwork and further displays a plurality of identical, elongated, multi-functional, super-ordinate, opened back box type ⊓-facer beams **10** (FIG 1and 2) arranged in parallel segments, with side webs **10b** (FIG.2) of box beams **10** generally wider than the face **10a** (FIG.1) and the open back of box beams **10**, webs **10b** are shaped by bending 90 degrees back and away from face **10a**, webs **10b** also have a deformed return lip **10c** (FIG.3) located at the back of webs **10b** where they bend into the open back side of beam **10**, lips **10c** are a method of adding strength and stability to the composure of beam **10**.

Box type facer beams **10**, as shown, are deformed from steel plates, however said plates may also be, aluminum, plywood or any other structural elements that require fixing together at the corners.

Side webs **10b** are machined providing a series of pentagon shaped openings **13** (FIG 3 and 12) openings **13** are patented (US patent #6,662,520) "breech and chamber" openings, breech and chamber openings **13**, form an irregular pentagon, pentagon **13** is comprised of walls **13a, 13b, 13c, 13d,** and **13e** (FIG 12).

The breech portion, calculated and machined marginally larger than the parameters of subordinate beams **14** (FIG.1), **14** generally rectangular and having four sides, **14a, 14b, 14c, 14d** (FIG.14), allows subordinate beams **14** to pass freely through the breech **13** of adjacent super-ordinate beams **10** openings **13,** also when the barrier is employed in a vertical application as in FIG.1, subordinate beam **14** in position **14f** (FIG.11) will be standing on edge **14a,** edge **14a** thus standing in the breech on wall **13a** of opening **13**, wherein **14a** is horizontally manipulated, lengthwise into a desired location, then located, **14** may be forcibly rotated on a sliding axis **14e** (FIG.11) until **14** is cramped within the chamber of opening **13** with opening wall **13b** (FIG.4) cramping into beam edge **14a** and opening wall **13c** (FIG.4) cramping into beam edge**14c**.

Upon completion of the cramping procedure, subordinate beams **14** are thus cramped and thus interlocked within chamber portions **13** of super-ordinate beams **10**

Also subordinate beams **14** systematically overlap one another **14h, 14g** (FIG.11) **14f** (FIG.8), within breech and chamber openings **13**, in this manner the lateral beams **10** of the barrier in FIG.1 may be extended in lateral segments infinitely using subordinate beams **14** of various lengths.

Sides **14a** of beams **14**, when cramped within the chamber of opening **13**, are ready to support facer panel **15** (FIG.1), **15** having a facer side **15a**, a back side **15b**, elongated edges **15c** with top and bottom edges **15d** (FIG.1 & 7A), panel side **15b** rests on beams **14** against sides **14a**, and between and butting edges **15c** against beam **10** webs **10b**, therein facer **15** is inventively sheathed within the confines established through the systematic interlocking facer beam barrier system assembly procedures, and when facer **15** edges **15c** are inside and against opposing beam webs **10b**, facers **10** face side **15a** is inventively in a static flat plane with super-ordinate beam face **10a**.

It is important to understand that in form system applications (FIG.1) the fastening of removable facer panels **15** requires only a minimum effort as concrete introduced between opposing barriers forces facers **15** against subordinate beams **14**.

Further the lateral spacing of super-ordinate beams **10** is inventively determined by the size of modular facers **15**.

FIG.7 an isometric view with a cutaway portion and subsequently FIG. 7A, 7B, 7C,_FIG.7D sectional views show a fastening mechanism **16** comprised of a plate **16** (FIG.7B) retained by a bolt **17** (FIG.7A), with a deformed shoulder **17a** (FIG.7C), fixed to face **10aa** (FIG.7B) of beam **10**, further **16** is locked to bolt **17** by nut **17b** (FIG.7C), deformed spikes **16c** (FIG.7A) have a ninety degree bend that allows them to penetrate plate **16** at holes **16a** (FIG.7A), there retained by nuts **16cc** (FIG.7A), and there to rotate freely as retractable fasteners.

The mechanism also requires wedge platforms **19a** and **19b** (FIG.7) to be fixed to inside face **10aa**.

Guide bars **20** (FIG.7 & 7B) fixed to beam **10**, inside face, 10aa and in line with holes **18** (FIG.7B), align and guide spikes **16c** in and out of working position.

16e and **16f** (FIG.7B & 7C) indicate points on plate **16** where manipulated hammer blows will rotate plate **16** on shoulder **17a**, shoulder **17a** spaces mechanism **16** an engineered distance from the inside face **10aa** of beam **10**, nut **17b** retains plate **16** yet allows free rotation of **16** in its engineered location.

When point **16e** is manipulated down onto wedge platform **19a**, spikes **16c** are extended beyond beam side-web **10b**, further FIG.7A displays spikes **16c** penetrating edges **15c** of facer panels **15** thus providing retention of **15** on a flat plane with beam face **10a**, wedge platform **19a** seats and arrests block **16**.

Device **16** thus offers a self-contained fastening appurtenance that may be retracted by manipulating plate **16** at point **16f** onto wedge platform **19b**, when retracted in this manner mechanism **16** is arrested in the stored location.

Device **16** thus inventively negates the need for independent fastening devices.

The sub-rigid barrier of FIG. 1, thus assembled, offers a static flat plane, where calculated loads may be applied.

Furthermore shoe **12** (FIG.2) offers a guide for the Facer Beam **10** to sit on as beam bottom plate assembly **21** (FIG.2) is designed to bridge shoe **12**.

Shoe **12** is a non-member of the barrier system however shoe **12** is the same size and composition as subordinate beam **14** and therefore plate assembly **21** is dimensioned and deformed to snugly fit over shoe **12**.

FIG.4 is a cutaway isometric view at the bottom of an extended beam **10**, sitting on top of a first beam **10**, that displays the top plate **25** and bottom plate **21** attached together using the pin **24** (FIG.4) contained by its pin retainer **23** (FIG 3).

Slot **21f** (FIG.3) receives plate **26** and hole **26a** extends through slot **21f** where it recieves pin **24** as **24** extends across slot **21f,** and subsequently pin handle **24a** is allowed to drop into slot **23b** (FIG.4) rendering pin **24** immovable thus creating an extended beam **10**.

Slot **23a** further allows pin **24** to be manipulated back to a retracted position where pin handle **24a** (FIG 3) is in line with beam **10** thus freeing the previously attached beams. Arched opening **10d** (FIG.4) is a view-port for manipulating pin **24**.

Face-to-face beams **10** (FIG.1&8), display self-contained through wall form tie **29** in working position, ties **29** are seen crossing the space between face-to-face barriers and penetrate beams **10** at hole **11** (FIG.2B).

Tie **29** is a part of a tie assembly FIG.2 better displayed in FIG.2A, 2B, & 2C. The assembly is comprised of pipe nipples **27** installed and fixed at beam **10** inner face **10bb** (FIG.2B) as retainers for pipes **28**, nipples **27** further allow, pipes **28** to rotate functionally, within their inner circumference **28b**.

As shown, pipe **28** is a retainer for bolt **29** and **29** is designed to pass through hole **28a** then thread through the novel inner nut **29b** and bolt head **29a** manipulates bolt **29**.

Nut **29b** is engineered to fit snugly and structurally within the inner circumference **28b** of pipe **28**. Bolt **29** extends through the face of beam **10**, at hole **11** (FIG.2C), when threaded through nut **29b**.

Work platforms **30** (FIG.1), are supported by staging bracket arm **31** (FIG.5), for men working above ground level.

The staging bracket assembly of arm **31** is shown in working position with a railing arm **34** (FIG.5), retaining railings **30a** (FIG.5), fastened in an upright position.

Arm **34** is a safety device that rotates up to stand 90 degrees away from arm **31** in order to support railing members that protect workers from falling off the work platform.

Arm **31** has the capability of releasing and folding down and back alongside arm **34** into storage position (FIG.6).

Arm **31** further comprises a mechanical appurtenance with bolt **35** (FIG.6A), loosely attached at hole **31d** (FIG.6A) with a pin shaped end **35a** (FIG.6A) and a nut **35b** (FIG.6A), for retaining and attaching arm **34**, into working position.

Arm **34** has a wedge, shaped appurtenance **34c** (FIG.6B), fixed on one side and a slot **34d** (FIG.6C) machined through wedge **34c** and through the web of arm **34** at end **34a** (FIG.6B).

Slot **34d** (FIG.6B) fits over bolt **35a** and is engineered to swivel on **35a** into storage position, and easily back to working position.

Arm **31** may be tightly wedged alongside arm **34** with the same mechanism that holds arm **31** in working position.

Furthermore bracket arm **31** is fixed and retained to beam **10** by retention pin **32** (FIG.6D), pin **32** attaches to the inside walls of opposing beam webs **10b** (or bolts through the webs), and passes through a hole **31a** (FIG.6D), see cutaway in arm **31** at **31a.**

31a allows arm **31** to slide side to side, guided by pin **32**, within the confines of beam **10**.

A plate **33** (FIG.5 cutaway view) is fixed within the confines of beam **10** and arm **31** end **31h** (FIG.6D) is held fast under plate **33**, placed under plate **33** by sliding arm **31** to the left side of the beam **10** enclosure along retention pin **32**, in so doing arm **31** is cantilevered out over pin **32** where **31** may serve as a support for a working platform.

When a working platform **30** is not needed arm **31** may slide to the right side of the beam **10** enclosure where end **31h** will be free from plate **33** thus allowing arm **31** to rotate at point **31a** down within the confines of beam **10** where it is housed along with arm **34** (FIG.6). FIG.6C indicates a storage attachment method. FIG. 6A is a bracketed exploded view of the parts **35, 35a** and **35b** joining arms **31** and **34**. FIG.6B is an isometric view of arms **31** and **34** remove-ably locked together.

FIG.2A is an expanded isometric view of beam **10,** base-plate **21**, and inside beam-face **10aa**, where base-plate **21** drops down to plate **21d** nuts **36** are shown as welded or otherwise fixed to plate **21d** and nuts **36a** may be threaded down thru nuts **36** until they contact the foundation where and if the threading continues the top of the beam will be pitched inward thus offering a method of plumbing beam **10**. Nut **38** welded or otherwise fixed to inner beam face **10aa** allows bolt **37** to be threaded thru

and on against a hardened concrete structure, whereby the protruding bolt **37** will systematically drive beam **10** away from a hardened concrete structure, thus providing an inventive method of bond-breaking.

FIG.8 is an isometric view of a segmented radius form and displayed are super-ordinate facer beams **10** in a vertical position inventively housing subordinate beams **14**, spanning only one bay each, as the formwork turns a radius in segments. Short pieces **14f** of subordinate beams **14** may be added and used to tie beams **14** together as they butt at the breech and chamber opening. Short pieces **14f** may be deformed at the edge that backs the facer **15** in order that **14f** fits the radius that tie beams **14** follow the shape of.

FIG.9, is an isometric view of an inventive segmented radius form with the super-ordinate facer beams **10** in a horizontal position and subordinate beams **14** in a vertical position and this method also works as an alternative for forming of straight walls.

In FIG.10, an isometric view of a column form is disclosed inventively employing super-ordinate facer beams **10** in a situation where extra ties **51** may run through holes **10g** in super-ordinate beams **10** and using standard flat plate washers **51a** and standard nuts **51b** thus providing the ability for beams **10** to secure the column form in two directions.

FIG.11 displays an end view of super-ordinate facer beams **10** with variations in positioning subordinate beams **14** with **14h** depicting a rotating beam on a sliding axis as it overlaps a chambered beam and **14g** indicates two chambered beams **14** in an overlapped situation and **14f** indicates a beam **14** standing in the chamber and **14e** indicates a single beam **14** rotating on a sliding axis into the chamber.

FIG.11A, displays end and side views of inventive alternate shape, breech and chamber openings and subordinate beams, **39, 39a, 39b** and **40** indicate various positioning attainable with alternative subordinate beams **39**.

FIG.11B, displays end and side views of inventive alternate shape, openings **42** and subordinate beams **41** and **41c** indicates an open area above the chamber portion of opening **42** and FIG.11C is an expanded view of opening **42** and opening **42** is dimensioned at the lower chamber portion between walls **42a** and **42b** marginally larger than the distance between the outside walls of flange **41a** and **41b** of subordinate beam **41,** thus allowing **41** to freely drop in raise out of the chamber.

FIG.12 displays an end view of facer beams **10, 10e**, and **10f** inventively used in a house-framing situation and a hole **43** indicates an opening aligning with hole **26a** (FIG.3) where vertical beam **10** may be fastened to a raftered beam **10f** and hole **44** indicates another opening aligning with hole **26a** that may be employed to attach a perpendicular structural floor framing beam **10e** to a structural wall framing beam **10**.

FIG.13 & 13A, display isometric views of an inventive alternative through wall tie assembly, that allows bolt **29** within pipe **28** to ride up and down in retainer guides **27a,** and furthermore **28** is a reduced in length, a reduction that allows pipe **28** to move side to side within guides **27a** and within the confines of beam **10**. The bracketed exploded view of FIG.13A identifies all the parts that are assembled within beam **10.**

In FIG.14&14A, an isometric and top view respectively of an inventive alternative chambering method indicates appurtenances **22** added to act as removable back chamber wall **13b** thus when removed subordinate beam **41** may run freely through opening **13** as opening **13** is machined larger between sides **13c** and **13b** (FIG.12) than the dimension between flanges **41a** and **41b** of subordinate beam **41**, FIG.14a further displays lip **10c** as a retainer and support for composition **22**.

FIG.15 is a top view of an inventive alternative chambering method is disclosed and indicates appurtenance **43** with a fixed retention nut **43a** and a threaded bolt **43b** threaded through nut **43a** and fast against beam **41** and **43** displays legs **43c** that are retained and supported by beam **10** lips **10c.**

FIG.16 is a top view indicating an alternative facer retention method whereby super-ordinate beams **45** are strategically deformed with side section **45c** bending away acutely from face **45a** and the surface of section **45c** having a depth equal to the width of deformed facer edge **46a**, **45c** then meets **45b** in an obtuse angle that leaves side-web **45b** perpendicular to face **45a** therein elongated edges **46a** of facer **46** are deformed to create an obtuse angle where facer edge **46a** meets beam face **45a** therefore facer **46** may be sheathed and arrested against subordinate beams **47** without the need for fasteners.

FIG.17 displays a facer beam barrier system, wherein an alternative improvement in retaining the facer panel **15** comprises;
Subordinate beams **48** machined with a series elongated penetrations **48b** through the flat elongated surface side **48a** of beams **48**, penetrations **48b** may be centered in

relation to side **48a** and penetrations **48b** are generally no wider than one third of the side to side distance across the flat side **48b** and penetrations **48b** are generally a length that assimilates the face **48b** width and penetrations **48b** are generally spaced apart a distance that allows frequent availability of penetrations **48b,**
The series of penetrations **48b** as shown (FIG.17A) allow deformed wedges **49** to be manipulated into penetrations **48b**.

Wedges may be manufactured by selecting a rectangular piece of material the same composition as or stronger than the material composition of subordinate beams **48** and the rectangular material is machined to a thickness marginally less than the width of said penetrations, said rectangular material **50** (FIG.18) is machined to a width determinably longer than the length of penetrations **48b** and rectangular material **50** is machined a determined length that will adequately span the height of breech and chamber opening **13** (FIG.13) when material **50** is separated from corner to corner along line **50a** thus separated two wedges **49** are manufactured and may be engaged with penetrations **48b**.

Subsequently when wedges **49a** and **49b** are forced against side-webs **10b,** parallel beams **10** are forced to apply compression on facer edges **15c.**
Therefore when a facer is between beams **10** it may be thus fastened in a flat plan with super-ordinate beam face **10a**.
Furthermore when a barrier is formed with three or more lateral super-ordinate beams **10,** with two or more facers **15** in place, opposing wedges **49c** and **49d** may be forcibly inserted at the outer sides of beams **10,** at each end of a barrier, thus compressing the entire barrier from side to side, thus providing a solid composition while maintaining a sub-rigid composition.